

$$\boxed{79} \text{ (a) } \omega = \frac{2\pi}{0.615} \text{ radians / yr} \Rightarrow \frac{\frac{2\pi}{0.615} \text{ rad}}{1 \text{ yr}} \cdot \frac{1 \text{ yr}}{365 \text{ days}} \cdot \frac{1 \text{ day}}{24 \text{ hr}} \approx 1.1662741 \times 10^{-3} \text{ radians / hr}$$

Thus, the orbital velocity of Venus is $v = 67.2 \times 10^6 (1.1662741 \times 10^{-3}) \approx 78,370 \text{ mi / hr}$.

$$\text{(b) } \omega = \frac{2\pi}{1} = 2\pi \text{ radians / yr} \Rightarrow \frac{2\pi \text{ rad}}{1 \text{ yr}} \cdot \frac{1 \text{ yr}}{365 \text{ days}} \cdot \frac{1 \text{ day}}{24 \text{ hr}} \approx 7.172585967 \times 10^{-4} \text{ radians / hr}$$

Thus, the orbital velocity of Earth is $v = 92.9 \times 10^6 (7.172585967 \times 10^{-4}) \approx 66,630 \text{ mi / hr}$.

$$\text{(c) } \omega = \frac{2\pi}{11.86} \text{ radians / yr} \Rightarrow \frac{\frac{2\pi}{11.86} \text{ rad}}{1 \text{ yr}} \cdot \frac{1 \text{ yr}}{365 \text{ days}} \cdot \frac{1 \text{ day}}{24 \text{ hr}} \approx 6.047711608 \times 10^{-5} \text{ radians / hr}$$

Thus, the orbital velocity of Jupiter is $v = 483.6 \times 10^6 (6.047711608 \times 10^{-5}) \approx 29,250 \text{ mi / hr}$.

$$\text{(d) } \omega = \frac{2\pi}{164.8} \text{ radians / yr} \Rightarrow \frac{\frac{2\pi}{164.8} \text{ rad}}{1 \text{ yr}} \cdot \frac{1 \text{ yr}}{365 \text{ days}} \cdot \frac{1 \text{ day}}{24 \text{ hr}} \approx 4.35229731 \times 10^{-6} \text{ radians / hr}$$

Thus, the orbital velocity of Neptune is $v = 2794 \times 10^6 (4.35229731 \times 10^{-6}) \approx 12,160 \text{ mi / hr}$.